

ROBOT ARM HAVING AN INTEGRATED DRIVE DEVICE

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The present invention relates to a drive device, in particular a robot arm for a robot which, if appropriate, is connected to a main drive via at least one arm such that it can be moved.

Drive devices of this type are known and can be obtained on the market in many forms and designs. The disadvantage is that these are all of very complicated construction in terms of apparatus and drive motors for moving these drive devices for robots are normally situated on said drive devices, that is to say can be connected to one another by diverse coupling elements and are implemented in a separate housing.

It is, moreover, disadvantageous that drive devices of this kind are very complicated to produce and, in particular, are not suitable for very small robots, mini robots.

The present invention is based on the object of providing a drive device of the type mentioned at the beginning which eliminates the aforementioned disadvantages and with which a drive unit, in particular a robot arm for robots, can be implemented which is of very small construction and can be used universally. Furthermore, it should be possible to implement very large angles, in particular swiveling angles and very high power and power densities.

In order to achieve this object, the robot arm has a plurality of drive motors for swiveling the housing and, if appropriate, for driving a spindle.

In the present invention, it has proven to be particularly advantageous to integrate a plurality of drive motors permanently in a housing, in particular in the robot arm, in order firstly to swivel the robot arm and secondly to drive a spindle in rotation and, at the same time, to permit a linear lifting movement of the spindle.

In this case, the motor elements can, for example, be permanently inserted into a corresponding receiving opening in the housing or mounted therein. In particular, thought may also be given for example to the respective mountings of the motor shaft being carried out in bearing plates which are accommodated in the housing.

In this way, the spindle rods and/or the shafts of the drive motors can be inserted into the housing in an integrated and cost-saving manner. Likewise, a transmitter element can be connected to one and the same shaft of the motor element, as a feedback instrument, absolute value transmitter, encoder, resolver or the like.

In addition, the appropriate mounting of the motor element is situated directly in the housing or is integrated into the housing. This ensures that the motor elements are formed as constituent parts of the housing itself, in order to swivel the robot arm and/or drive the spindle in rotation